

Claims

1. Device for conveying strip-shaped material, such as a tread, from a feed side to a discharge side, comprising a main conveyor belt extending from the feed side to the discharge side, and auxiliary conveyor belts on both sides of the main conveyor belt and which each comprise a feed conveyor belt and a discharge conveyor belt, and a slit-shaped opening between the feed conveyor belt and the discharge conveyor belt, positioned for on both sides of the main conveyor belt forming a slit.
- 5 2. Device according to claim 1, wherein the slit-shaped openings of the auxiliary conveyor belts extend in line.
- 10 3. Device according to claim 1 or 2, wherein the main conveyor belt is adapted for over its full length supporting a strip.
- 15 4. Device according to any one of the preceding claims, wherein the main conveyor belt comprises retaining means for retaining the strip-shaped material on the main conveyor belt.
- 5 20 5. Device according to claim 4, wherein the retaining means retain the strip on the main conveyor belt over almost its full surface supported on the main conveyor belt.
- 25 6. Device according to any one of the preceding claims, wherein the main conveyor belt is smooth for retaining an unvulcanised rubber strip on the main conveyor belt almost fixed in place.

7. Device according to any one of the preceding claims, wherein the auxiliary conveyor belts are smooth for retaining an unvulcanised rubber strip on the auxiliary conveyor belts almost fixed in place
- 5 8. Device according to any one of the preceding claims, further comprising a recorder, preferably an image recorder, such as a camera or line scan camera, above or below the slit.
- 10 9. Device according to claim 8, wherein opposite the recorder at the other side of the slit a lighting unit is disposed, such as a fluorescent lighting or a stroboscopic lighting.
- 15 10. Device according to claim 8 or 9, further provided with a control unit, operationally connected to the recorder, memory means for storing an image of a complete strip of strip-shaped material, and calculation means for calculating the strip position on the device based on the recordings of the image recorder.
- 20 11. Device according to any one of the preceding claims, further provided with means for laterally moving the discharge side while conveying a strip.
- 25 12. Device according to any one of the preceding claims, wherein the device is provided with an axis of rotation at the feed side or the slit, and the means for laterally moving the discharge side while conveying a strip have the device rotate about the axis of rotation.
- 30 13. Device according to claim 11 or 12, when depending on claim 10, wherein the control device is operationally connected to the means for lateral movement, and to driving means for the main conveyor belt for thus knowing the position of the strip on the main conveyor belt in the longitudinal direction, and the control means comprise reference positions for the strip on the device, wherein the control device is adapted for during

conveyance of the strip controlling the means for lateral displacement.

14. Device according to any one of the preceding claims, wherein the feed conveyor belts are shorter than the discharge conveyor belts, preferably shorter to such an extent that the slit is near the feed side.
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15. Device according to any one of the preceding claims, wherein the conveyor belts are so-called timing belts, provided with a servo-drive.
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16. Device according to any one of the preceding claims, provided with driving means at the feed side for the common driving of the main conveyor belt and feed conveyor belts.
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17. Device according to claim 16, wherein the main conveyor belt and the discharge conveyor belts at the discharge side comprise a common driving roller or guiding roller.
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18. Tread application device for applying a tread on a building drum for a tyre, comprising:
 - a tread conveying device for conveying a tread to a building drum, from a feed side of the tread conveying device to a discharge side of the tread conveying device in a conveyance direction, and
 - a positioning device for positioning the tread on the building drum, wherein the positioning device comprises measuring means at the feed side
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- for determining the position of a segment of the tread and generating a position value, displacement means for displacing the segment of the tread with a displacement directional component parallel to the axis of rotation of the building drum, and control means, connected to the measuring means and the displacement means, for on the basis of the position value controlling the displacement device during the application of the segment of the tread on the building drum.
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19. Device according to claim 18, wherein the tread conveying device comprises a main conveyor belt extending from the feed side to the discharge side.
- 5 20. Device according to claim 19, wherein the tread conveying device comprises auxiliary conveyor belts on both sides of the main conveyor belt.
- 10 21. Device according to claim 20, wherein the auxiliary conveyor belts comprise a feed auxiliary conveyor belt and a discharge auxiliary conveyor belt.
- 15 22. Device according to claim 21, wherein the main conveyor belt comprises a feed bearing roller and a discharge bearing roller, wherein the feed bearing roller forms a bearing roller for the feed auxiliary conveyor belts and the discharge bearing roller a bearing roller for the discharge auxiliary conveyor belts.
- 20 23. Device according to claims 21 or 22, wherein the feed auxiliary conveyor belts and the discharge auxiliary conveyor belts are disposed with their ends at a mutual distance for forming a slit.
- 25 24. Device according to claim 23, wherein the feed auxiliary conveyor belts and the discharge auxiliary conveyor belts are positioned for on both sides of the main conveyor belt forming a slit, wherein the slits on both sides of the main conveyor belt are in line.
- 30 25. Device according to any one of the preceding claims 18-24, wherein the tread conveying device is positioned mobile for displacing the discharge side with a directional component parallel to the axis of rotation of the building drum.
26. Device according to claim 25, wherein the tread conveying device is

rotatably positioned about an axis of rotation substantially perpendicular to the displacement direction, preferably substantially perpendicular to the plane of the tread.

- 5 27. Device according to claim 26, wherein the tread conveying device is positioned with the axis of rotation near the feed side for rotating the tread conveying device substantially parallel to a tread to be applied, preferably with the axis of rotation substantially in the middle below a tread to be applied.
- 10 28. Device according to claim 25, 26 or 27, wherein the centring device comprises an actuator which is connected to the tread conveying device for displacing the discharge side.
- 15 29. Device according to any one of the preceding claims 18-28, wherein the measuring means comprise an image recorder for recording an image of a segment of a tread on the tread conveying device.
- 20 30. Device according to claim 29, wherein the measuring means comprise a calculation unit for calculating a middle position value of the segment from a recorded image of a segment.
- 25 31. Device according to any one of the preceding claims 18-30, comprising means for securing a segment of a tread, preferably a tread over its full surface, on the tread conveying device.
- 30 32. Device according to any one of the preceding claims 18-31, comprising pressing means for retaining a segment of a tread on the building drum.
- 35 33. Device according to any one of the preceding claims 18-32, further comprising further measuring means for determining the length of a tread.

34. Device according to claim 33, further comprising means for adapting the length of a tread based on the result of the difference between the length measured and a predetermined set length.
- 5 35. Device according to claim 34, wherein the measuring means comprise at least one image recorder for recording an image of at least a segment of the tread, the control means comprise a computer, the tread conveying device comprises driving means for driving the tread conveying device at an adjustable speed of movement of the tread, and the building drum comprises
10 building drum driving means for driving the building drum at an adjustable speed of circulation, wherein the image recorder, the driving means and the building drum driving means are connected to the computer for exchanging data with the computer, and the computer comprises software for based on images of the image recorder calculating the position and the length of a tread, and based on the calculated length adjusting the mutual operation of
15 the driving means and building drum driving means.
36. Method for applying a tread on a building drum for a tyre, wherein the position of each segment of the tread on a tread conveying device is measured, after which the tread conveying device conveys the tread to the building drum and applies it on the building drum, wherein during application of the tread on the building drum the position of a segment of the tread that is applied on the building drum is repeatedly adjusted to a pre-set value prior to it being applied on the building drum by laterally displacing the tread
20 conveying device with respect to the building drum.
- 25 37. Method according to claim 36, wherein over nearly the full length of the tread the middle is repeatedly determined from a measurement of the position of both sides of a segment.
- 30 38. Method according to claim 36 or 37, wherein during the application the tread on the building drum a part of the section of the tread that has not yet

been applied on the building drum is displaced with respect to the building drum with a displacement component parallel to the axis of rotation of the building drum.

- 5 39. Method according to claim 38, wherein during displacing the part of the tread that has not yet been applied on the building drum, a leading part of the tread is applied on the building drum, and a trailing part of the tread is retained on a tread conveying device.
- 10 40. Device comprising one or more of the characterising measures described in the description and/or shown in the drawings.
41. Method comprising one or more of the characterising measures described in the description and/or shown in the drawings.